

WHAT IS CLAIMED IS:

1. An apparatus for directly imaging small particles consisting essentially of:

an integrated array of light sensitive pixels having a surface configured to receive the small particles within a distance effective for the particles to affect the pixel readout amplitude and where the pixels have an area on the order of the
5 area of the small particles to be directly imaged;

a light source for illuminating the integrated array; and

means for displaying an output from the pixels to provide an image of the small particles directly contacting the surface of the array.

2. The apparatus of Claim 1, wherein the integrated array of light sensitive pixels is selected from the group consisting of CCD arrays and CMOS arrays.

3. The apparatus of Claim 2, where the pixel area is less than about 5 micron square.

4. A method for directly imaging small particles comprising:

forming an integrated array of light sensitive pixels having a surface configured to receive the small particles within a distance above a light sensitive surface of the pixels effective to detect selected characteristics of the small
5 particles;

placing the small particles directly on the surface of the pixels;

outputting an image signal from individual ones of the light sensitive pixels;

and

displaying the image signal to provide a visualization of the small particles.

5. The method of Claim 4, further including the step of selecting an integrated array having pixel sizes less than the size of the small particles.

6. The method of Claim 4, further including the step of illuminating with a collimated light source the integrated array of light sensitive pixels having the small particles on the surface of the pixels.

7. An apparatus for directly imaging small particles comprising:
an integrated array of light sensitive pixels having a surface configured to directly receive the small particles within a distance effective for a selected characteristic of the particles to be directly detected by the light sensitive pixels
5 and where the light sensitive pixels have an area on the order of the area of the small particles to be directly imaged;

video means for displaying an output from the light sensitive pixels to provide an image of the selected characteristic of the small particles directly contacting the surface of the array.

8. The apparatus of Claim 7, wherein the integrated array of light sensitive pixels is selected from the group consisting of CCD arrays and CMOS arrays.

9. The apparatus of Claim 8, where the selected characteristic is selected from the group consisting of: absorption, light scattering, and light emission.